waste from sink in scullery, which, besides promoting cleanliness, increases the value of the manure. Earthenware tubes of 4 or 5 inches diameter, glazed on the inside, are deemed quite effectual for the drainage, which should be conducted to a liquid manure tank, fixed away from the building. The pan recommended is that usually seen engraved in the advertisement sheets of THE BUILDER.

A pump should be fixed where it would be mutually convenient to the occupants of both cottages. All the water from the roof should, nevertheless, be saved.

The ventilation is managed by means of a warm air chamber, supplied from without, through air bricks, at the back of kitchen range. The air should enter the various chambers through perforated zinc plates, at a moderate temperature, from the sides of chimney breasts, near the floor, and quit them through similar apertures on the other sides, near the ceiling. The air flues are carried up without communication to the top.

W. BOUTCHER.

## THE CHURCH OF S ISAAC AT S. PETERSBURG,

ERECTED BY THE CHEVALIER DE MONTFERRAND.*

BEFORE continuing the notice of the building, perhaps I may be permitted to call attention to the enormous application of the electrotype or galvano-plastic process in the sculpture of this cathedral by the architect. After having made very important experiments, he was authorised to adopt this mode in the execution of the metallic sculptures and carvings for the following reasons:—

1. The identical reproduction of the sculpture without chiselling.

2. The lightness of the pieces, which enabled the architect to introduce sculptures of higher relief than any hitherto known, and to fix the pieces suspended from the vaultings, without fear of accident, or of their being detached.

3. The great saving of expense between these and castings in bronze.

The gilding also was effected by the same process, and presented equal advantages.

The seven doors of the cathedral will be of bronze and electrotype, the frame work being of the former, and the sculptural parts of the latter. Three of these doors are 30 feet high, and 14 feet wide, the four others 17 feet 8 inches wide. They contain fifty-one bas reliefs, sixty-three statues, and eighty-four alto-relievo busts, of religious subjects and characters.

There is so remarkable a departure in the construction of the dome from the systems hitherto adopted, that I shall be perhaps pardoned in trespassing further on your attention by describing, with the aid of the annexed diagram, the whole assemblage of this important feature.

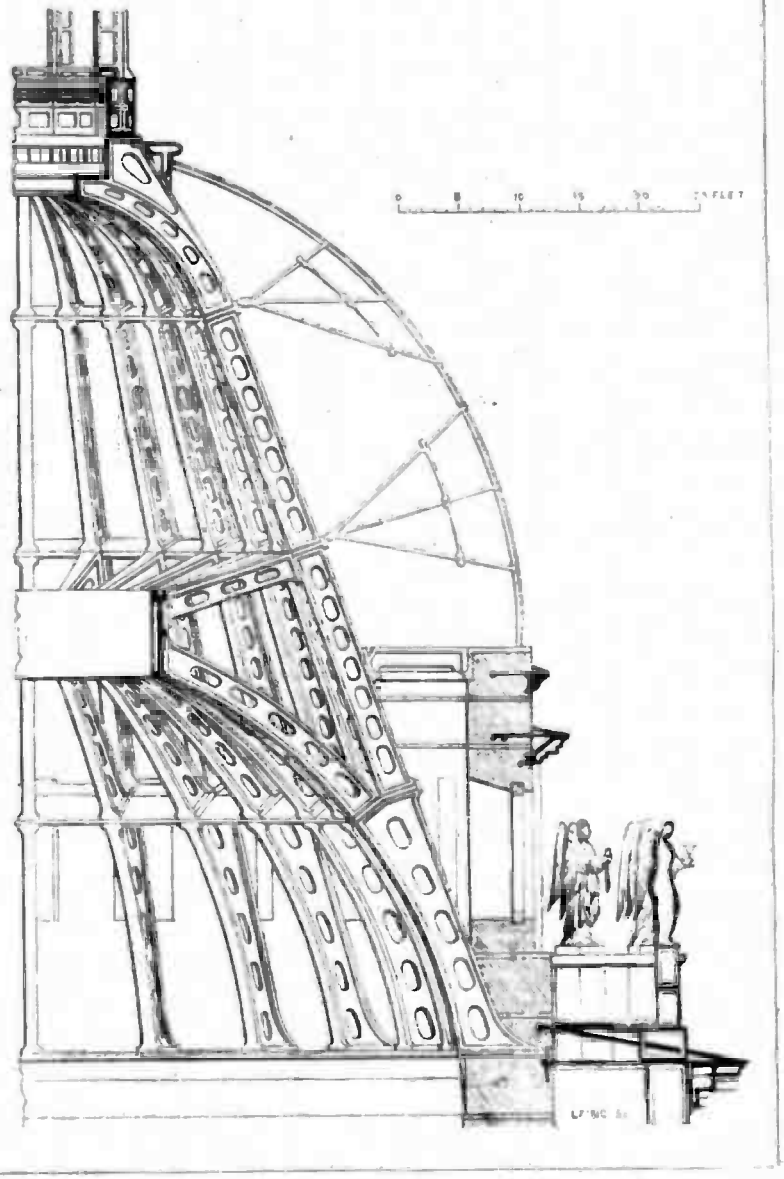
In alluding to the cupolas previously erected, the chevalier pays a just tribute to the genius of our illustrious Wren, and recognises S. Paul's "as the only existing dome presenting an irreproachable solidity." He, therefore, adopted the principle of Sir Christopher, carrying it out in a combination of wrought and cast-iron, and hollow pots.

The walls of the drum of the dome are carried up in solid construction of brick, with tiers of stone bond, and are above 8 feet thick. On the level of the top of the cornice of the circular colonnade, which girds the drum, there is a series of twenty-four cast-iron ribs, the feet of which rest on a cast-iron plate 7 feet wide, which runs quite round the circumference. The lowest division of each rib rises to a height of about 23 feet, in its narrowest part is 3 feet 4 inches wide, in its broadest 5 feet, with upper and lower ribs, and the central part lightened by large apertures. At their head all the ribs are attached to a horizontal plate or curb, 6 feet 3 inches wide, which follows the periphery of the dome. At this height the rib is divided into two, the one part about 2 feet 6 inches deep, following the sweep of the inner dome for a height of 20 feet, at its summit bolted to a cast-iron perforated cylinder, 21 feet in diameter, and 7 feet high: this forms the central aperture at the summit of the inner dome. The other part follows the line of an intermediate cone, with a catenary

* See p. 590, *ante*.

CHURCH OF S. ISAAC, AT ST. PETERSBURG.

CONSTRUCTION OF DOME.



outline, and similar to the one in our S. Paul's: it is also 21 feet long, and 2 feet 6 inches deep, and perforated to render it lighter. At this height the heads of the ribs are again secured to another horizontal plate or curb, which forms a complete circle, and is 3 feet wide; and this curb and the ribs are tied to the cylindrical opening of the inner dome, already mentioned, by radiating beams 2 feet 3 inches deep. The conical ribs have then another length of 21 feet, and their heads are again connected by another horizontal plate, from which spring the circular ribs, about 16 feet long, forming a dome to the intermediate cone, and their heads also bolted to a cylinder, 8 feet 6 inches in diameter, and 18 inches high. But the upper portion of the ribs diverge at top, so as to form a base for the octagonal cupolino, which consists of a series of cast-iron story posts, ribs, and bracketings, inclusive of the dome of the cupolino, with its ball and cross at the apex, which last are of brass gilt. The filling in between the ribs consists of pots, the surfaces of which were subsequently rendered with plaster, and painted with sacred subjects. The sphere of the outermost or third dome, consists of a series of wrought-iron T ribs tied to the conical dome by rods. The external face of this outer dome is divided by twenty-four bold ribs, and is covered with bronze, gilt in three thicknesses of leaves of ducat gold. The three principal gilders of St. Petersburg were charged with the inspection of the execution of this portion of the work, and rejected every leaf that had the slightest spot or blemish.

The whole entablature and flat, and the balustrade over the peristyle of the drum of the cupola, likewise consist of cast and wrought-iron framing, faced with plates of copper, to form the profiles and mouldings. The twenty-four pedestals of this balustrade carry winged angels of bronze, above 9 feet high, each of a single casting.

The quantity of metal employed in the dome is as follows:—

| | | |
|---|---|---|
| Ducat gold | | 247 lbs. |
| Copper | 52½ tons. | |
| Brass | 321½ tons. | |
| Wrought-iron | 524½ tons. | |
| Cast-iron | 1068 tons. | |
| | 1966½ tons. | 247 lbs. |

The foresight of the architect has provided the following precautions against lightning, so much the easier, as the summit of each dome is in metal: at the top of the crosses of the bell towers and of the cupolino of the central dome are rods of plating, terminating in a point: each dome at its springing has isolated iron conductors, which go down to the roofs; and in the direction of the cast-iron rain-water